

UNIT 1

Iowa's Wildlife Resource Base

What is Wildlife?

Wildlife is defined many ways. Some think of animals in a zoo. Others think of predators and prey—a hawk catching a mouse. Wildlife includes animals that live free and find their own food, water, shelter, and other needs. This means spiders, insects, backyard birds, and moles, as well as lions, tigers, bison, and elk.

Domestic animals (e.g., dogs, hamsters, cows) are not wildlife. They have been bred by humans for a specific purpose and depend on humans for food, water, shelter, and survival.

Some wild animals can be **tame** (conditioned to accept and tolerate human presence). Some normally wild animals (e.g., elk, bison, white tail deer) are raised as domestic animals for food or aesthetics. People often purchase skunks, raccoons, or even mountain lions from captive breeders as pets without considering the adult size of the animal, the specialized care it will need, and the potentially dangerous behaviors it will develop. These animals do not make good pets and are sources of **zoonotic diseases** (diseases that can be transmitted from wild animals to humans). People sometimes release these animals into the wild after they realize the amount of time and expense needed to properly care for them. They usually starve to death or seek out humans because they are unable to take care of themselves in the wild.

Some domestic animals become **feral** (escape confinement and can survive without human help). Feral animals are not a natural part of ecosystems. They compete with native animals for food and shelter and can transmit disease to wildlife.

Domestic, tame, or feral animals are not wildlife, however, they may impact wildlife, so should be considered when wildlife management plans are made. For example, cats and dogs can devastate native wildlife populations. Cats kill millions of migratory songbirds and game birds in the United States each year. The American Bird Conservancy started a “Cats Indoors” campaign to convince cat owners to keep their pets inside. Indoor cats can live into their teens. Outdoor cats typically live less than five years.

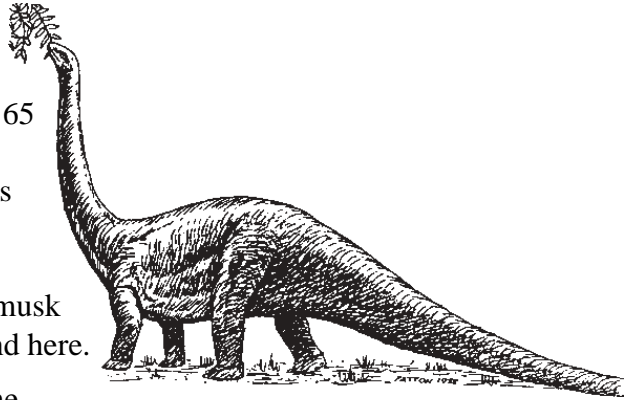
So what is wildlife? Wildlife managers consider wildlife to be free roaming, naturally occurring species that live within nature's system without significant influence by people.



Historical Perspective

Evidence of wildlife from prehistoric times is present in rocks that have been worn and weathered over millions of years. Geologists believe Iowa was covered by mountain ranges from 4.5 billion to 570 million years ago. Shark's teeth, coral, and other marine fossils are found in rock layers formed from 570 to 230 million years ago, indicating Iowa was covered by a shallow sea and had a tropical climate.

Dinosaurs, birds, and mammals lived here in a subtropical climate from 230 to 65 million years ago. From 2.5 million to 10,000 years ago the climate got colder as glaciers advanced and receded. Iowa was covered by an evergreen pine and spruce forest between glacial periods. Caribou, musk ox, and even collard lemmings were found here.



Glaciers covered Iowa for the last time about 11,500 years ago. The climate began to warm. Deciduous forests of oak, maple, basswood, and elm trees covered the state. Northern leopard frogs, tiger salamanders, and fox squirrels appeared. The climate grew warmer still. Prairie, a plant community better adapted to the warmer, drier conditions and periodic fires, replaced forests. Badgers, ground squirrels, and plains spadefoot toads began to appear.

The Paleo-Indian culture was found in North America from 15,000 to 8,000 years ago. These nomadic hunters traveled in small family groups and followed migrating big game animal herds such as mammoth, horse, camel, and earlier forms of bison.

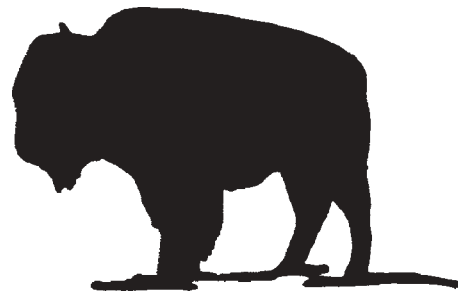
Archaic Indian groups inhabited North America between 8,500 and 1,000 years ago. They made many technical advances in spear points and lived mainly as nomadic hunters and gatherers. Archaic hunters still pursued big game, but there is evidence that smaller animals (e.g., deer, elk, fish, turtles, birds) and plants were becoming more important. Archaic Indian populations were small family groups that moved about as seasons and animal herds changed and moved.

The last group of prehistoric people in North America belonged to the Woodland tradition. They were present in North America about 3,000 years ago. They perfected pottery making, burial mounds, and cultivated plants. The woodland people used spears to hunt, but after about 500 A.D. there is evidence they used bows and arrows.

The Plains Village pattern appeared in Late Prehistoric times (A.D. 1000 to 1650). These people began to adapt to life on the prairies of South Dakota, Nebraska, and Iowa. They were the ancestors of several Midwestern tribes such as the Ioway, Oto, Missouri, and Winnebago.

Iowa was inhabited by at least 17 Native American groups at the time of Euro-American settlement. The Ioway, Sauk, Fox, and Sioux were the dominant tribes. Some Late Prehistoric villages supported over 2,000 people. These tribes planted corn, hunted, and trapped animals for food. Very little meat was wasted and pelts (furs) were used to make clothing and blankets. These people took only what they needed. Plants and animals were left to repopulate for the next hunting and gathering season.

Relics from the past can be found if you have an eye for detail or are excavating. Mastodon tusks, woolly mammoth teeth, elk antlers, bison skulls, arrow or spear points, and even dinosaur bones can be found in the sandbars or cut away banks of Iowa's rivers and streams.



Early Euro-American Explorers

Early explorers, who originally came from Europe to settle in America, ventured into Iowa for many reasons. Some were trappers or traders who lived off the land, trapped animals for their valuable pelts, and established trading posts as a means of getting supplies and selling their pelts to European fur companies. Others were missionaries looking to establish missions. Military men were sent to map and secure land deeded to the United States.

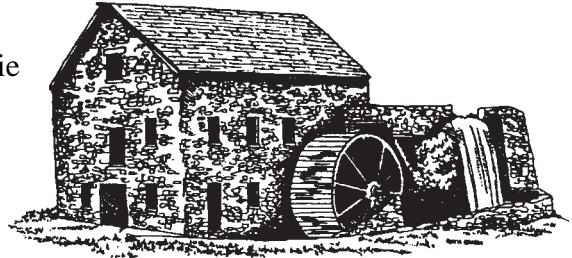
Father Jacques Marquette and Louis Joliet made the first well-documented expedition into Iowa in 1673, but very little was written about other expeditions until Lewis and Clark came to explore the newly acquired Louisiana Territory. Arriving in Iowa in 1804, the expedition traveled up the Missouri River, following the instructions of President Jefferson, to find the source of the river, document physical features, and make contact with local Native American tribes. The explorers found wildlife abundant, killing as many as five deer a day. They caught channel catfish near present-day Council Bluffs, where they found the creatures “very common and easy taken.” Near Onawa, Lewis described the number of pelicans seen as “almost in credible.” Near Sioux City, Clark commented on “very plentiful” beaver, “very fat ducks,” and plovers “of different kinds.”

What did early Euro-Americans see when they arrived in Iowa? Forests covered eastern Iowa. Trees lined river and stream corridors in the state's interior and covered valleys in western Iowa. Prairies were abundant in central and western Iowa. Prairie potholes and meandering streams were found throughout Iowa's interior. More than 450 species of vertebrates lived in Iowa when the Europeans first arrived. Journals documented sightings of white-tailed deer, beaver, wolves, bison, elk, black bear, passenger pigeons, prairie chickens, cranes, and swans.

The United States began opening up the Midwest for settlement by signing treaties with local Native American groups as early as 1804. The Black Hawk Purchase of 1832 made it legal for settlers to move into territories west of the Mississippi. More than 1,500 Euro-Americans came to Iowa in the summer of 1833. Most newcomers came seeking land and were pleasantly surprised by Iowa's favorable climate, sufficient rainfall, generous growing season, abundance of timber, fertile land, and variety of wildlife.

Impact of Settlement

The settlers began to create a life for themselves in Iowa. Land was cheap or free and could be acquired quickly. Euro-Americans first settled near the Mississippi because it was accessible by boat. Hardwood trees, such as oaks, provided logs for homes and furniture. Wood for fuel was abundant. Settlers knew how to break the dense roots in the prairie soil by the time the government opened Iowa for settlement, having already perfected these procedures in the Grand Prairie area in Illinois. Iowa's streams provided adequate water flow for operating grist and lumber mills. Wildlife was abundant and provided food and pelts for settlers.



Loss of Native Species

Bison, wolf, elk, white-tailed deer, beaver, and turkeys were **extirpated** (no longer found here, but have populations elsewhere). White-tailed deer were abundant in Iowa, even on the prairies of extreme northwestern Iowa 200 deer could be seen in the early 1870s. But, they were gone from Iowa by 1900.

Bison were not found in large herds in Iowa, but in scattered small groups, making them easier to kill. They were gone from the state before the market hunting of the vast herds in the West peaked. Whenever a bison was seen an attempt was made to kill it. All reports of bison in Iowa after 1860 involve a chase and end with the death of the bison.

Historic accounts of travelers through Iowa note that elk were more abundant on the prairie than bison, thus the town names Elkhorn, Elkhart, and Elk River. The winter of 1856-57 was very severe in Iowa, with deep snow and ice cover. Elk herded together and were killed in large numbers by settlers that year. Elk were not seen in Iowa in any number after that winter and were gone completely by 1871.



A bounty system was established for coyotes and wolves in Iowa in 1817. This was an attempt to eliminate these “vermin.” This system, however, had a debatable effect. Many settlers “farmed” wolves, killing or trapping only the young of the year, leaving the adults to reproduce and make next year’s income. One pelt (ears, lips, scalp) could be good for several bounties if presented in different ways in different counties.

Drastic habitat changes probably affected wolves the most. They were absent from the state by the 1910s. Coyotes managed to adapt to changes in the landscape. Though their numbers were very low by the early 1900s, coyotes were sighted occasionally throughout Iowa by the mid-1900s. Populations have since recovered.

Two birds that inhabited Iowa are now **extinct** (a species no longer in existence)—the Carolina parakeet and the passenger pigeon.

Iowa and eastern Nebraska were on the northwestern edge of the Carolina parakeet's range. It was a woodland species that lived throughout the eastern United States south to Florida. The upper Mississippi and Missouri River valleys were its main habitats in Iowa. Birds gathered in large flocks and destroyed fruit and grain crops. It was killed as a pest and became increasingly scarce as forests were cleared. The last flock of 30 birds was in Florida in 1920.

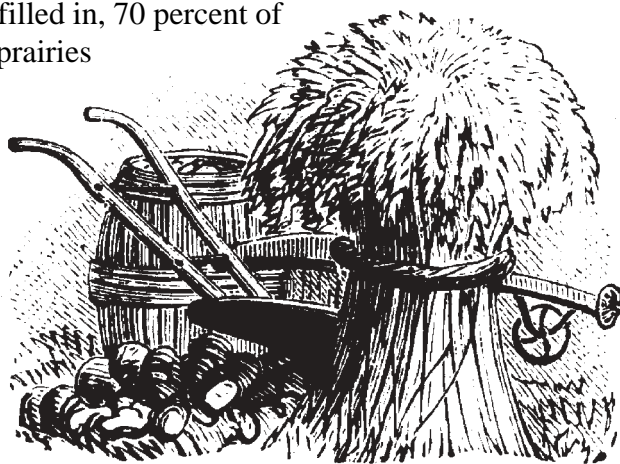
Early records indicated passenger pigeon flocks could number in the billions. Market hunters killed birds year round by any means possible—baiting them with alcohol-soaked grain, starting fires beneath their nests, or picking young pigeons off the ground when they fell out of trees. Birds were shipped east to markets and restaurants. Market hunting ended as soon as it was not profitable and tens of thousands of passenger pigeons remained in suitable habitat, but populations continued to decline. Apparently these birds needed to nest in the vast colonies in which they were found originally. The last passenger pigeon died in the Cincinnati Zoo in 1914.

Reintroduction programs, hunting and trapping laws, and habitat restoration projects initiated by the Iowa Department of Natural Resources (IDNR) and other organizations have brought deer, turkey, beaver, and river otters back to the state. They once again are common. Trumpeter swans, peregrine falcons, sharptail grouse, prairie chickens, and barn owls, although not so common, also have returned to Iowa through restoration programs. See the *Native Species Reintroduction Success Stories* chart in Unit 3 for more information about reintroduced species.

Changes in the Landscape

Iowa's population grew rapidly with increased riverboat traffic up the Mississippi and the beginning of a railroad in 1853. Demand for land and natural resources increased. Ninety-five percent of Iowa's wetlands were drained or filled in, 70 percent of Iowa's forests were cleared, and 99.5 percent of Iowa's prairies were plowed within a 100-year period.

Many habitats that once supported an abundance of wildlife species were converted to cropland, towns, railroads, and cities. It is estimated that only one tenth of the state is similar to what the first settlers found. These remaining areas are small, widely scattered remnants—compared to millions of acres of contiguous habitat that once existed. Animals that need large expanses of habitat (e.g., large predators) may be gone from Iowa forever. Others have adapted and survived.



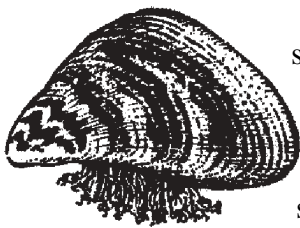
Introduced vs. Native Species

Iowa's wildlife includes both native and introduced species. America's first immigrants introduced many species of wildlife to North America. **Non-native** species (animals that did not naturally occur in an area) sometimes may compete with native wildlife for food, water, and shelter and can be more aggressive than **native** wildlife species (animals that naturally occur in an area).

Rock doves (pigeons) were brought to America as pets, escaped, and began populating cities. The house mouse and the Norway rat came to America as stowaways on ocean going vessels.

Young house sparrows eat insects. They were brought to America to help control insects on farms, but rapidly spread throughout the United States displacing many native birds. They also take over the nests of bluebirds and swallows, often destroying the eggs and nestlings.

The American Acclimatization Society introduced the European starling because they wanted to establish every bird mentioned in Shakespeare's work in America. Unfortunately, starlings take over active nests of other birds, throwing out the owner's eggs or young and incubating their own eggs in the nest. They also eat grain intended for cattle, damage crops, foul buildings and walkways, and may transmit the human fungal disease histoplasmosis.



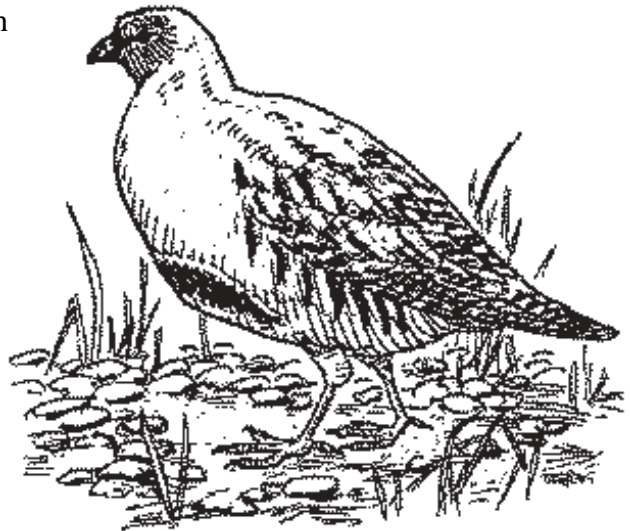
Zebra mussels were introduced in North America in 1985 by transoceanic ships that discharged ballast water into Lake St. Claire. They spread into the Mississippi River by 1992. Large numbers of these mussels can filter all the water in a lake, removing plankton that serve as food for larval fish and clearing the water so more aquatic vegetation grows. This can be harmful to some native fish populations (e.g., walleye).

Gypsy moths were brought to America from Europe by a French scientist trying to create a new race of silk-producing caterpillars in Massachusetts. A few escaped. They eat the leaves of about 500 kinds of trees and shrubs, especially oak trees, destroying millions of acres of trees.

Cornborers are the larval stage of pyralid moths. Some feed on stored grain and probably were introduced into the United States in bags of seed corn from Europe. They can kill young corn crops by eating foliage or boring into plant stems.

Some species were introduced to North America to provide hunting and fishing opportunities similar to those enjoyed by wealthy landowners in settlers' home countries (e.g., ring-necked pheasant, gray partridge). Rainbow and brown trout were introduced into some northeast Iowa streams to enhance sport fishing.

Humans have impacted the types of plants and animals found in Iowa today. Many native plants and animals do not have natural defenses against introduced species, unlike species that evolved together in North America. Introduced species may not have predators here to keep their populations in balance. These factors allow some introduced species to become significant pests to people as well as to native animals and plants.



Current Status of Wildlife in Iowa

Iowa's wildlife has changed tremendously since Euro-American settlement (160 years ago). Many species have been extirpated. Others' populations have dwindled to the point they now are listed as endangered. Still others have increased in number and range size. Many once extirpated have been reintroduced and now have stable populations. Wide ranging species (e.g., black bear, wolf, mountain lion) occasionally reappear in Iowa as their populations in nearby states increase.

Endangered Species

In Iowa, 49 animals and 64 plants are listed as **endangered** (populations are low, scientists feel the species could become extinct). Another 89 plants and 35 animals are listed as **threatened** (populations are declining, may become endangered). A species can be listed as endangered or threatened at the state or federal level, depending on the extent of the area where the population is declining. Federally endangered species found within a state's borders automatically are placed on the state list. Endangered species lists constantly change.

Visit IDNR's web page
www.iowadnr.com/other/threatened.html
for a complete list of Iowa endangered
and threatened species.

Endangered and Threatened Species in Iowa

Group	mammals	birds	amphibians	reptiles	fish	invertebrates	plants
Number of endangered species	4	9	2	8	8	18	64
Number of threatened species	2	2	2	7	9	13	89



*peregrine
falcon*

Endangered or threatened species usually are monitored closely and their remaining habitats are protected. This special attention can pay off. An endangered species can be brought back from the brink and removed from the list instead of becoming extinct (e.g., peregrine falcon). The use of DDT (a now illegal pesticide) is the main reason this bird became endangered. DDT was banned, birds were reintroduced in suitable areas, and they were protected from shooting. After almost 30 years, the peregrine was removed from the federal endangered species list in 1998.

Mammals

There are fifty-four species of mammals in Iowa. They often are grouped based on the foods they eat. Their teeth reflect their diet. **Herbivores** (plant eaters) have sharp front teeth for cutting vegetation and flat back teeth for grinding. **Carnivores** (meat eaters) have long, sharp canine teeth and sheering molars. **Omnivores** (eat both plants and animals) have combinations of sharp, sheering, and grinding teeth.

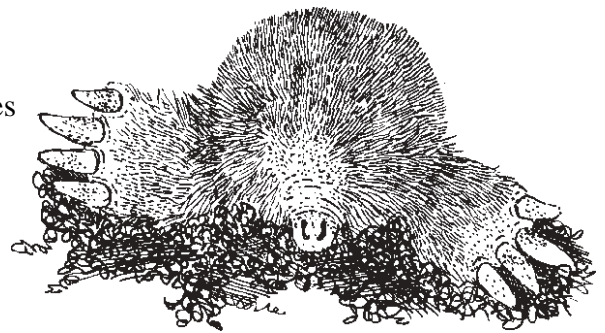
Insectivores (insect eaters) have teeth with one cusp or point. Similar kinds of mammals are grouped into families and similar families are grouped into orders. Iowa mammals belong to seven orders.

Marsupials (pouched mammals) have only one representative in Iowa, the opossum. Opossums are expanding their range to the north and can even be found in southern Minnesota.



opossum

Moles and shrews are **insectivores**. Moles burrow through the soil in search of grubs. Shrews hunt worms, snails, spiders, and insects using a poison in their saliva to disable or kill their prey.



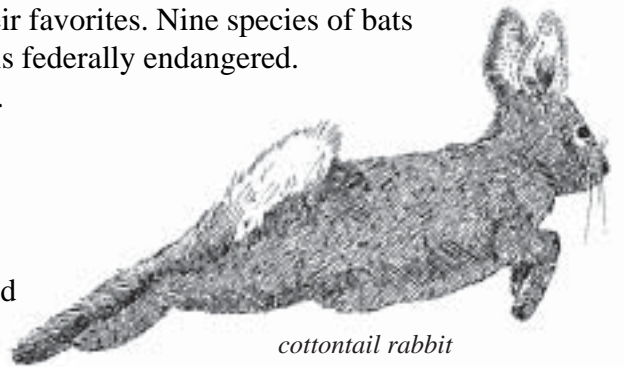
eastern mole

Bats are the only true flying mammals. They belong to the order **Chiroptera**. They use **echo-location** (send out clicking sounds and use the echoes to locate objects) to find their flying insect food. Mosquitoes and cornborer moths are among their favorites. Nine species of bats are found in Iowa. The Indiana bat is federally endangered. Iowa bats are protected by state law.



hoary bat

Rabbits and hares are **lagomorphs**. The cottontail rabbit is found throughout the state and makes itself at home in urban yards. The white-tailed jackrabbit is an open country hare found in isolated pockets in northern and western Iowa.



cottontail rabbit

Rodents (gnawing mammals) include mice, lemmings, voles, rats, ground squirrels, chipmunks, tree squirrels, woodchucks, pocket gophers, muskrats, and beaver. They have two characteristic orange front teeth (**incisors**) and no canine teeth, with a gap between the incisors and molars.



beaver



red fox

Not all species in the order **Carnivora** are carnivores. Some are omnivores (e.g., fox, coyote, skunk, raccoon). Many will not pass up a free meal and are opportunistic **scavengers** (eat animals that have died recently). Iowa carnivores include mink, weasel, badger, and otter. Some large carnivores are finding a home in Iowa once more. Sightings of black bear, mountain lion, bobcat, and wolf are more frequent each year. Recent bear, mountain lion, and bobcat sightings have included young of the year, indicating reproduction in the wild.

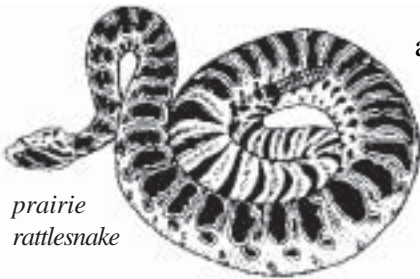


white-tailed deer

Ungulates (hoofed mammals) walk on one or two large toes. Iowa has one resident representative, the white-tailed deer. Elk, moose, mule deer, and even antelope occasionally are seen in the state.

Reptiles

Reptiles (snakes, lizards, and turtles) are cold-blooded, lay their eggs on land, and have dry, scaly skin. There currently are forty-six species of reptiles in Iowa.



prairie
rattlesnake

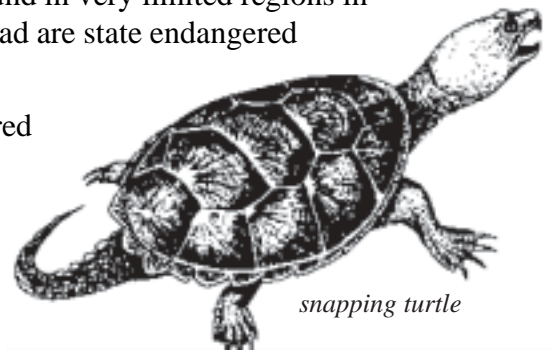
Iowa has twenty-eight kinds of snakes. Most are harmless and very beneficial. They can be found in forests, prairies, and wetlands. Fox and bull snakes eat small rodents.

Garter snakes, which thrive in gardens, eat insects and small rodents. They are easy to spot when they sun themselves in the spring after coming out of hibernation.

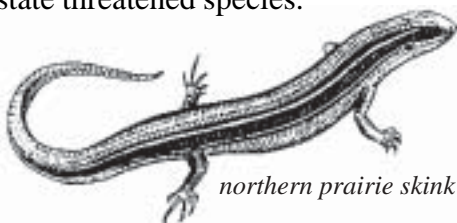
There are four venomous snakes in Iowa: timber rattlesnake, Massasaugua, prairie rattlesnake, and copperhead.

Chances of seeing these snakes are small because they are found in very limited regions in Iowa. The Massasaugua, prairie rattlesnake, and the copperhead are state endangered species.

Thirteen turtles reside in Iowa. Painted turtles, with their red painted plastron (underside), often can be found sunning themselves on logs in ponds. Snapping turtles (often considered a delicacy) are fierce predators with strong beak-like mouths that inhabit Iowa rivers and ponds. The ornate box turtle lives in prairie habitats in western Iowa and is a state threatened species.



snapping turtle



northern prairie skink

Only five species of lizards live in Iowa. The northern prairie skink is most common and can be found in sandy habitats near prairie-forest edges. Five-lined skinks are found in small areas of northwest and northeast Iowa near rock

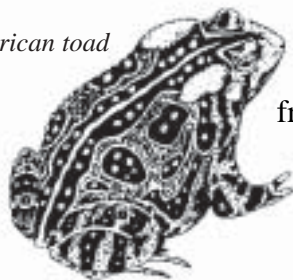
outcroppings. They have a brilliant blue tail that can **regenerate** (grow back) if it is broken off by a predator. The six-lined racerunner is found along the Mississippi and Missouri rivers in dry, sunny grasslands. Their long pointed nose is ideal for searching the cracks of rotting trees for termites and other insects. The great plains skink is endangered in Iowa and is limited to the extreme southwestern Loess Hills area.

Amphibians

Amphibians (salamanders, frogs, and toads) are cold-blooded with moist skin. They usually are found near water where they lay their eggs. The eggs develop into tadpoles, which have gills and live in water while they are developing into adults. Many amphibians are known as **indicator species**. Their absence may indicate polluted water, because their lives are so closely connected to water and water quality.

Iowa has five kinds of salamanders. The yellow spotted tiger salamander, known for its voracious appetite for worms, is the most common. The central newt is found in eastern Iowa in small ponds and roadside ditches. It is brightly colored with a yellow underside and many black spots. The smallmouth salamander is found in southern Iowa near woodland pools. It has small blue spots and resembles the endangered blue-spotted salamander.

American toad



Many frog calls are misleading because they can be very loud, even when the frog is only about the size of a thumbnail. Bullfrogs, leopard frogs, chorus frogs, and cricket frogs are common statewide near ponds and wet roadside ditches. Green frogs and spring peepers are found in eastern Iowa. The American toad commonly visits gardens and yards, often burrowing into the soil and coming out at night to catch insects.

Fish

There are 148 species found in Iowa. Some (e.g., largemouth bass, bluegill, channel catfish) are found throughout the state in many different kinds of water. Others (e.g., trout, smallmouth bass, paddlefish) are found only in certain high quality habitats.

Two federally endangered species inhabit Iowa waters: the pallid sturgeon and the Topeka shiner. The pallid sturgeon is extremely rare and confined to the Missouri River. The Topeka shiner is a small fish found in prairie streams. It uses oxbow wetlands for egg-laying and nursery areas. Fifteen other species of fish are listed as either endangered or threatened in Iowa.



channel catfish

Major fish groups found in Iowa include primitive fish (lampreys, paddlefish, sturgeon, gar, and bowfin), trout, herring, mooneye, pike, suckers, minnows, catfish, temperate bass, sunfish, and perch. Consult the brochure, *Fish Iowa! An Introductory Guide to the Fish of Iowa* for more information about individual species of Iowa fish.

Birds



rough-winged swallow

Almost 400 species of birds have been documented in Iowa. They are placed in one of three categories: **sighted regularly** (seen every year or nearly every year somewhere in Iowa—300 species), **casual** visitors (seen in the state in many but not all years—15 species), or **accidental** (seen once to occasionally—79 species). The sharp-tailed grouse and Eskimo curlew have been extirpated from Iowa. Two former Iowa residents (passenger pigeon, Carolina parakeet) are extinct. Almost 200 kinds of birds nest in Iowa.

Following is a list of Iowa bird groups and their habitats.

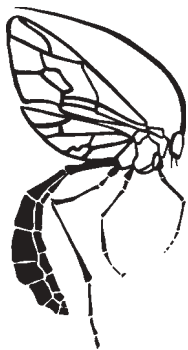
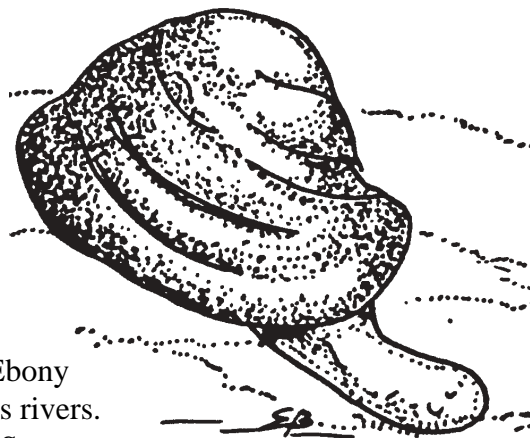
Iowa Bird Groups

Bird group	Habitat	Species comments
loons, grebes, pelicans, cormorants	lakes, wetlands, rivers	<i>loons</i> —large divers with dagger-like bills, visit occasionally during migration; <i>pelicans</i> —migrate through IA; pied-billed <i>grebes</i> —nest in prairie pothole marshes of NW IA; <i>cormorants</i> —usually nest in colonies (rookeries)
bitterns, herons, egrets	lake shores, wetlands, river edges	long-legged; wade shallow water in search of fish to spear with long, sharp beaks; <i>herons</i> & <i>egrets</i> —colonial nesters
waterfowl—swans, geese, ducks	lakes, wetlands, rivers	webbed feet and water-proof feathers; most are dabblers or divers, eating plant material strained from water or dredged from bottom; <i>trumpeter swans</i> are a restored nester in Iowa wetlands
raptors—vultures, kites, eagles, hawks, falcons, owls	varied habitats	<i>turkey vultures</i> —nest throughout the state, migrate; <i>Mississippi kites</i> —occasional nesters; <i>bald eagles</i> —nest along most large rivers; <i>red-tailed hawks</i> —most common large daytime raptor; <i>American kestrels</i> & <i>peregrine falcons</i> nest here; <i>owls</i> —7 species, mostly nocturnal predators
partridge, grouse, turkey, pheasant, quail	grassland, wooded edges, woodland	most are hunted; <i>gray partridge</i> & <i>ring-necked pheasant</i> —introduced species, do well in a mixture of crop and grassland; <i>ruffed grouse</i> —limited to woodlands of NE IA; <i>greater prairie chickens</i> —protected, nest in IA after 50-year absence; <i>turkeys</i> —woodlands; <i>bobwhite quail</i> —shrubby edge areas
shorebirds—rails, plovers, sandpipers, gulls, terns, cranes	lake shores, wetlands, river edges	<i>rails</i> —secretive wetland birds; <i>plovers</i> —2 species nest in IA (common killdeer, endangered piping plover); <i>upland sandpiper</i> —nests in grassland areas, other sandpipers usually near water; <i>gulls</i> and <i>terns</i> —usually seen over water; <i>sandhill crane</i> —nests in IA after 100-year absence
pigeons, doves	buildings, backyards, farms, shrubby edges	pigeons (rock doves)—introduced to Iowa; mourning doves nest in IA, many spend winter at backyard feeders
nighthawks, swifts, swallows	roofs, chimneys, buildings, rock outcrops	IA nesters; feed on insects they catch on the wing
hummingbirds	woodlands with streams	ruby-throated hummingbird is only species that nests in IA
kingfishers	streams, rivers	belted kingfisher catches small fish; nests in stream and river bank cavities
woodpeckers	woodlands	9 species in Iowa; dig invertebrates from wood or bark with long, pointed bill
songbirds	varied habitats	includes jays, nuthatches, wrens, warblers, thrushes, thrashers, waxwings, cardinals, blackbirds, finches, and sparrows

Invertebrates

Mussels, clams, snails, and insects are **invertebrates** (animals with no backbone). They often go unnoticed because they are less conspicuous than other animals. However, they can be indicator species and are a crucial part of food chains. They also comprise about three-fourths of all animal species.

Some clams and mussels are harvested for food. Ebony shell and washboard mussels are widespread in Iowa's rivers. Several mussel species are threatened or endangered. Some snails live on land, some in water. Land snails often are found in forests in rotting logs and leaf litter. Eastern Iowa is home to the endangered Pleistocene snail that lives only on algific slopes cooled by cave air.

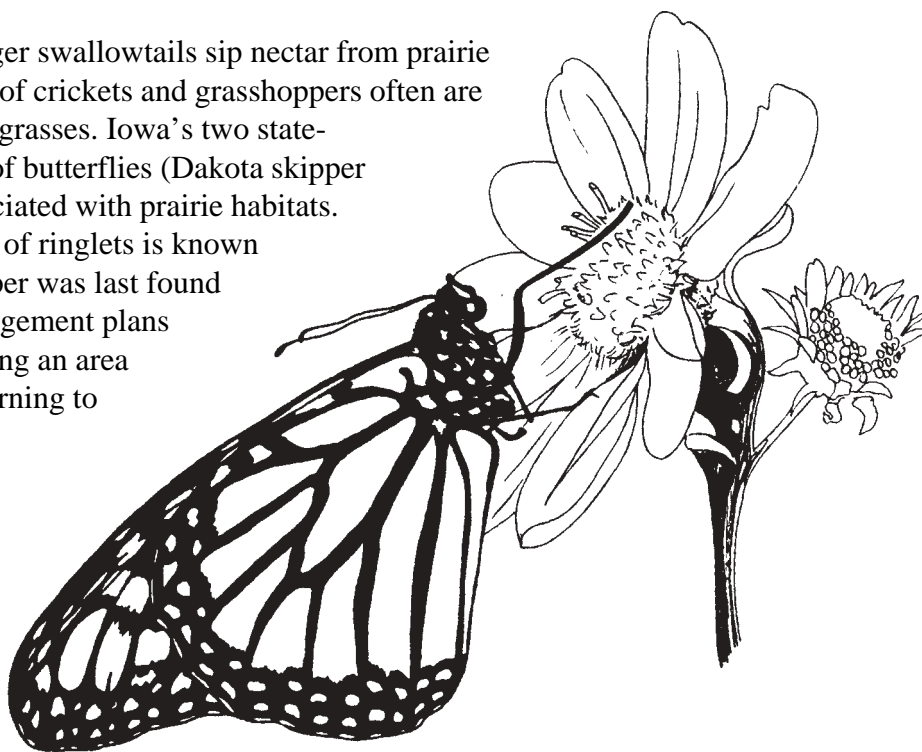


Invertebrates come in many shapes and live in all habitat types. Some provide beneficial services. Others can cause problems. All are part of a balanced ecosystem.

Dragonflies can be seen near water searching for mosquitoes and other flying insects. Predaceous diving beetles live and hunt in Iowa waters. Immature stages of the dragonfly, stonefly, and mosquito also are aquatic.

Large wolf spiders hunt for their food in most terrestrial habitats, especially prairies. Deer ticks are very small woodland parasites that can carry Lyme disease. Bees, butterflies, and moths search out flowers for their nectar and aid in the pollination of plants.

Monarchs and tiger swallowtails sip nectar from prairie flowers. The sounds of crickets and grasshoppers often are heard among prairie grasses. Iowa's two state-endangered species of butterflies (Dakota skipper and ringlet) are associated with prairie habitats. Only one population of ringlets is known and the Dakota skipper was last found in 1992. Prairie management plans usually include leaving an area during prescribed burning to insure that dormant invertebrates are not destroyed.

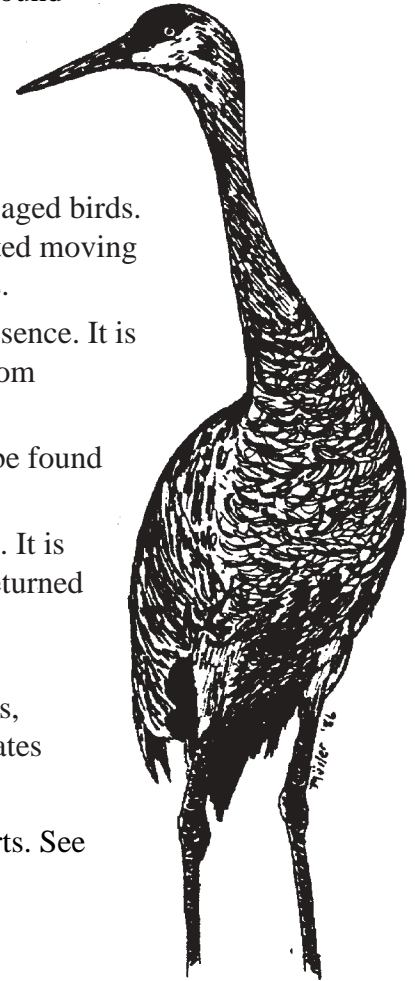


Expansion

Some animals have reoccupied their former ranges and others' ranges have expanded into Iowa. A **range** is the geographic area a species occupies or where it is found regularly. The following species' ranges have expanded into the state.

- Bullfrogs, originally found in the southeast corner of Iowa, have moved into suitable habitat throughout the state, sometimes aided by people who enjoy a plentiful supply of frog legs in their ponds.
- House finches (native to the west coast) were taken to the east coast as caged birds. Some were released in New York in 1940, did well in the wild, and started moving west. House finches now nest in Iowa and are common at winter feeders.
- Sandhill cranes started nesting in Iowa again in 1992 after a 100-year absence. It is thought that these nesters are part of a breeding population moving in from Wisconsin.
- Bald eagles have reoccupied and expanded their range. They again can be found along many of Iowa's larger rivers.
- Bobcats are sighted in western Iowa and in the Des Moines River valley. It is thought that small, isolated populations of this secretive wild cat have returned to Iowa.
- Mountain lion, black bear, wolf, elk, moose, and armadillo have made appearances in the state. They probably have been wandering individuals, which is the first indicator of a species range expansion. Neighboring states have confirmed sightings of all these species.

Other species have been reintroduced through planned conservation efforts. See *Unit 3: Wildlife Management* for more information about these.



Other Materials

- Borror, D.J. and R.E. White. 1970. *Peterson's Field Guide to the Insects of North America and Mexico*. Boston: Houghton Mifflin Company.
- Biodiversity of Iowa: Aquatic Habits. CD-ROM. 2001. Des Moines: Iowa Department of Natural Resources.
- Burt, W.H., and R. P. Grossenheider. 1976. *Peterson's Field Guide to the Mammals of America North of Mexico*. Boston: Houghton Mifflin Company.
- Caduto, M.J. and J. Bruchac. 1997. *Keepers of the Earth, Native American Stories and Environmental Activities for Children*. Fulcrum, Inc. Golden.
- Christiansen, J.L. and R.M. Bailey. 1991. *The Salamanders and Frogs of Iowa*. Des Moines: Iowa Department of Natural Resources.
- Christiansen, J.L. and R.M. Bailey. 1997. *The Lizards and Toads of Iowa*. Des Moines: Iowa Department of Natural Resources.
- Christiansen, J.L. and R.M. Bailey. 1990. *The Snakes of Iowa*. Des Moines: Iowa Department of Natural Resources.
- Conant, R. 1975. *Peterson's Field Guide to Reptiles and Amphibians*. Boston: Houghton Mifflin Company.

Dinsmore, J.J., et al. 1984. Iowa Birds. Iowa City: University of Iowa Press.

Iowa Association of Naturalists. 1992. Endangered Species in Iowa. Guthrie Center.

Iowa Department of Natural Resources. 1990. Fish Iowa! An Introductory Guide to the Fish of Iowa. Des Moines.

Iowa Department of Natural Resources. 1992. Living on the Edge: Endangered Species in Iowa. Des Moines.

Laubauch, C.M., Bowles, J.B. and R. Laubauch. 1988. A Guide to the Bats of Iowa. Des Moines: Iowa Department of Natural Resources.

National Shooting Sports Foundation. Un-Endangered Species: The Success of Wildlife Management in North America. Riverside, CT.

Peterson, R.T. 1980. Peterson's Field Guide to the Birds East of the Rockies. Boston: Houghton Mifflin Company.

Zim, H.C. and A.C. Martin. 1987. A Golden Guide to Birds. New York: Golden Press.

Zim, H.C. and A.C. Martin. 1987. A Golden Guide to Butterflies and Moths. New York: Golden Press.

Zim, H.C. and A.C. Martin. 1987. A Golden Guide to Fishes. New York: Golden Press.

Zim, H.C. and A.C. Martin. 1987. A Golden Guide to Insects. New York: Golden Press.

Zim, H.C. and A.C. Martin. 1987. A Golden Guide to Mammals. New York: Golden Press.

Zim, H.C. and A.C. Martin. 1987. A Golden Guide to Reptiles and Amphibians. New York: Golden Press.

endangered.fws.gov (federally endangered/threatened species list)

www.batcon.org (Bat Conservation International–bat facts/trivia, educator activity book)

www.enature.com (online field guide including range maps, natural history information, photos, and more on mammals, birds, amphibians, reptiles, insects, spiders, bees, wasps, etc.)

www.herpnet.net (Iowa Herpetology–species information and photos)

www.legis.state.ia.us (Iowa Administrative Code–#571, Chapter 77, state endangered/threatened species list)

www.iowadnr.com/other/threatened.html (Iowa threatened/endangered species list)

www.wolf.org (information on North American wolf species and their conservation efforts)

WILD Activities (grade level)

Ethi-Reasoning (5-8)

First Impressions (K-4)

From Bison to Bread: The American Prairie (9-12)

Habitat Rummy (5-8)

Hazardous Links, Possible Solutions (7-8)

Here Today, Gone Tomorrow (5-8)

Planting Animals (5-8)

Prairie Memoirs (5-8)

Pro and Con: Consumptive and Nonconsumptive Uses of Wildlife (5-8)

Wildlife is Everywhere! (K-4)

Wildlife Issues: Community Attitude Survey (9-12)

What's Wild? (K-4)

* *Supplemental information provided for italicized activities.*